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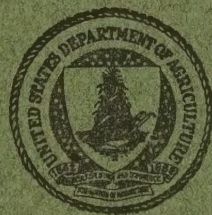
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A Description of the
LIVESTOCK EXHIBIT

of the
UNITED STATES DEPARTMENT OF AGRICULTURE
at the

Twenty-fifth
International Live Stock Exposition

Chicago, Illinois,
November 29 to December 6,
1924.



Livestock Exhibit

TWO STEERS ON THE SAME TRAIL

It has been the aim of beef cattle breeders for over a century to produce higher quality in the meat animal. Although it is difficult to measure the extent to which our beef breeds have been improved, we can safely say that it has been considerable.

The ideal beef type desired by breeder and feeder of beef cattle is an animal that will produce the largest proportion of the highest priced cuts of beef when slaughtered. This implies a low-set animal of straight lines, broad and deep bodied, and smoothly covered with a thick, even layer of firm flesh. A fine texture of hair and hide usually indicates a high quality of meat. An animal of poor breeding usually deposits its fat around the internal organs instead of interspersing it among the more valuable cuts of lean meat. This type is characterized by such undesirable features as light hindquarters, high flank, narrow thin loin, small heart girth and long, narrow head and neck.

The purpose of this exhibit is to show the incentive for further improvement of our beef breeds. A product that more nearly fulfills the requirements of the consumers usually is enough more valuable to make its production profitable. The story begins with two calves on the range, one common and one good, and compares them at different stages until they reach the consumer.

Part I. On the Range.

To give some idea of the cost of producing range calves under present conditions, the average cost for 17 prairie ranches in Colorado in 1922 is given. This is not given as an average for the whole range country and is typical only of conditions in that area for that year. The figures given were obtained by the United States Department of Agriculture and the Colorado Agricultural Experiment Station and are an average of the cost of carrying 9,351 cows which weaned 5,230 calves on these 17 ranches in 1922. These ranches raised a 56 per cent calf crop that year.

Annual Cost Per Cow and Cost of Raising a Calf to Weaning
Time in Colorado - 1922.

Operating Costs:	Cost per cow	:	Cost per calf ¹
Winter feed and salt	\$ 2.08	:	\$ 3.71
Hired man labor	1.56	:	2.80
Taxes on land and cattle	1.13	:	2.03
Death loss on breeding herd	1.96	:	3.50
Depreciation on breeding herd		:	
and equipment	4.13	:	7.40
Repairs and miscellaneous expense	.74	:	1.33
Total operating costs	11.60	:	20.77

Annual Cost Per Cow and Cost of Raising a Calf to Weaning Time in
Colorado - 1922 (Continued)

Operating Costs:	Cost per cow	:	Cost per calf ¹
Interest on investment (actually paid)	\$ 4.03	:	\$ 7.22
Interest on operator's own capital	4.09	:	7.30
Value of labor performed by ranch operator	.77	:	1.38

¹The cost per calf is greater than the cost per cow because only 56 cows out of 100 weaned calves.

A comparison of the returns from good and common calves is given in the next table. For this purpose the returns from one of the 17 Colorado ranches producing good calves are compared with those of another ranch on which common calves are produced. An effort was made to choose for this comparison two ranches on which the cost of producing good and common calves would be fairly comparable. However, this was impossible because of the disturbing influence of other factors such as variations in per cent of calf crop and in methods of management which may have as much or more effect on the cost of producing calves as the quality of their breeding. We might expect that calves of good quality might cost somewhat more than common calves because of the greater investment in the breeding herd, which might result in a higher risk figure and more depreciation in the case of the best quality cattle. Breeding cattle of good quality, however, have this higher value because they are capable of producing more valuable calves. The difference in sales value of the calves more than makes up for any difference in the cost of producing them.

Two live calves, one grading good and the other grading common, are shown in this section of the exhibit.

Returns from Good and Common Calves

(Comparison of Calf Sales on Two Colorado Ranches in 1922)

	<u>Good Calf</u>	<u>Common Calf</u>
Weight when sold	350 pounds	310 pounds
Sales price per hundredweight	\$ 7.71	\$ 5.07
Sales price per head	26.98	15.72
Greater sales value of good calf as compared with common calf	11.26	

Good calves excel common calves on the range because-

1. They weigh more at the same age.
2. They sell for more per hundredweight.
3. They mature earlier.
4. They are in demand as killers, feeders and stockers, while common calves are fit mainly for stockers.
5. They may cost more to produce but they sell for much more.

Part II. In the Feed Lot.

This section of the exhibit is illustrated by two feeder steers, one grading good and the other common. As good quality calves sell for the most money when they leave the range there must be some explanation of this fact in their performance in the feed lot and at the fat cattle market. To make this comparison between the feed-lot performance of good and common steers, figures obtained in DeKalb County, Illinois, during the winter of 1922-23 by the United States Department of Agriculture and the University of Illinois are used.

Good and Common Cattle in the Feed Lot in Illinois During 1922-23.

	<u>Good Steers</u>	<u>Common Steers</u>
Number of droves.....	15	26
Number of cattle.....	703	1785
Number of days on the farm.....	174	143
Purchase weight (pounds)	888	824
Gain in weight "	298	189
Sales weight "	1186	1013
Average daily gain "	1.71	1.32
Purchase price per hundredweight	\$ 7.00	\$ 5.13
Original cost per head.....	62.16	42.27
Value of feed.....	36.93	23.26
Other costs.....	5.29	4.85
Cost of animal out of feed lot.....	107.52	78.25
Pork and manure credit.....	6.41	6.07
Net cost out of feed lot.....	101.11	72.18
Amount sold for out of feed lot.....	107.62	72.64
Profit per head.....	6.51	.46
Sale price per hundred weight (out of lot).....	9.07	7.16
Necessary margin to break even	1.52	1.99
Farm price of corn	.54	.54
Price returned per bushel of corn fed.....	.73	.55
Cost of silage per ton.....	5.00	5.00
Amount that could have been paid for feeders and break even.....	7.73	5.18

Amount of Feed and Other Costs per 100 Pounds Gain.

	<u>Good Steers</u>	<u>Common Steers</u>
Feed:		
Grain (pounds)	664	693
Silage "	1261	1871
Protein concentrates "	21	29
Molasses "	10	2
Mixed hay	225	315
Stover and straw	102	152
Pasture days	9	8
Feed cost per 100 pounds gain	\$12.32	\$14.92
Other costs	2.82	4.07
Total cost of 100 pounds gain	15.14	18.99
Pork and manure credit	2.14	3.21
Net cost of 100 pounds gain	\$13.00	\$15.78

It will be noticed that because of the better use of feed, greater gain per day and higher sales price when finished, the feeder of the good steers could have paid as much as \$7.73 per hundredweight for them, while \$5.18 per hundredweight was the most that could have been paid for the common steers and still break even.

Good Steers Excel Common Steers in the Feed Lot Because:

1. They require less feed per pound of gain.
2. They require a shorter feeding period for same gain.
3. They require less margin between purchase and sale price.
4. They sell for more per hundredweight.
5. They make greater daily and total gains.
6. There is greater pride in owning them.

Part III. At the Market.

Under the captions "On the Hoof" and "On the Hook" the two grades of fat steers and their carcasses are compared at the market. Weights and prices used in these comparisons are actual average figures taken from the Chicago market, October 1 to 31, 1924. The two comparisons follow:

"On the Hoof"

	<u>Good Steers</u>	<u>Common Steers</u>
Live weight	1,160 lbs.	978 lbs.
Selling price per cwt.	\$9.85	\$6.33
Sale price per head	\$114.26	\$61.91
Dressing percentage	56%	51%
Difference	\$52.35	

"On the Hook"

	Good Steer Carcasses	Common Steer Carcasses
Weight.	650 lbs.	499 lbs.
Wholesale price per cwt.	\$16.78	\$10.75
Sale price per carcass.	\$109.07	\$53.64
• Difference	\$55.43	

When market steers of the two grades are compared on a carlot basis, including marketing costs, the contrast is even greater than that shown above, because the freight, commission, yardage and insurance charges are the same in both cases. Using average figures at the Chicago market for October, 1924, two shipments of steers from the same point to Chicago are compared. A carload of 20 steers grading good netted \$303.82 more than a carload of 24 common steers of approximately the same total weight.

An analysis of the quality of cattle slaughtered at Chicago during 1923, shows that two-thirds of them failed to grade as high as "good." Only 8.2% were prime and choice; 25.6% graded good; 42.6% graded medium; 19.6% common; and 4.0% cutter and canner. These figures show that there is still great opportunity for improving the quality of the cattle slaughtered in the United States. It should be kept in mind, however, that these percentages represent an analysis of all cattle slaughtered. Great numbers of dairy cattle that are killed annually greatly reduces the total average quality. A wider use of purebred sires and better breeding methods hold the greatest opportunities for improving the quality of our market beef cattle. However, the feeder also should keep in mind the fact that proper feeding may raise feeder steers to a higher grade when finished.

"On the Block."

The characteristics of good steer beef and common steer beef are contrasted in this portion of the exhibit, under the headings of conformation, finish and quality.

Good steer beef has the following characteristics:

Conformation: Fairly blocky and smooth; thick flech; broad loin; full round; symmetrical shoulder; and deep rib.

Finish: Well-distributed covering of creamy-white and firm fat; moderate supply of kidney and cod fat.

Quality: Flesh firm and velvety; moderately fine grained; mellow; light red; some marbling; and juicy.

Common steer beef, has the following characteristics:

Conformation: Angular and rangy; shallow flesh; narrow loin; light round; heavy shoulder; and shallow rib.

Finish: Scanty covering of yellowish soft fat; little or no kidney and cod fat.

Quality: Flesh soft; moist; very dark red; coarse grained; stringy; and no marbling.

The exhibit shows wholesale and retail cuts of the two grades of beef, including the rib, round, loin and chuck, displayed in refrigerated showcases.

A large chart shows a side of beef with the various wholesale cuts lined off and numbered, as well as the more common retail cuts derived from each wholesale cut.

A summary of the differences between good and common carcasses states that the former are used largely to supply the better class of trade such as large hotels, dining cars and discriminating households, while the latter furnish the bulk of beef used by low-class restaurants, contract commissaries, construction camps and cut-rate shops.

"On the Table"

Choose meat wisely and cook it properly. These two requirements are so closely associated in making it possible to serve roasts of first-class quality that it is difficult to mention one without in the same breath stressing the other.

A standing rib roast is considered choice as roasts go, but there is more to know in the ordering of a cut of meat than its name, as is shown by the roasts exhibited. Each is from the seven prime ribs, but the chief difference lies in the grade of beef animal and this affects appearance, juiciness, and texture.

Therefore to be able to supply her table to the best advantage, the housewife should know first of all the characteristics of the market grades of dressed beef and the typical retail cuts sold over the counter as roasts, steaks, pot roasts, and stew meat. But even wisely chosen, a good piece of meat may easily be ruined in cooking; so in the second place, she must know the method of cooking that will bring out the best qualities of the particular grade and cut selected.

The two roasts exhibited were cooked by the same method. They were roasted in the oven without moisture, which is accepted good practice for a prime rib roast and other tender cuts. The cut from the low-grade animal is so far below standard, however, that cooking by this method did not give a product comparable with the other roast. A few main principles to apply therefore not only in the selection of meat but also in its preparation for the table are outlined in the following paragraphs.

Judging the Grade of Meat

From the housekeeper's standpoint the grade of meat is determined by the following points which are applicable to all classes of dressed beef:

1. The color and texture of the lean meat, and the extent to which it is marbled with fat. Bright red color and even grain are the most desirable.
2. The thickness of the meat covering the bone, that is, the proportion of meat to bone.
3. The amount and character of the fat and its general distribution and color.
4. Amount of inside fat, such as kidney fat on the loin cut and layer fat on the inside of the ribs.

Cuts

In any one carcass the parts of the animal that have been exercised are made up of tougher muscle or coarser fiber and are drier, for example, the neck and the shank. The less-exercised parts, which are imbedded in the bone structure, have more tender muscle fiber and are more likely to have a protective layer of fat on the outside as well as marbled fat throughout the lean. Prime rib roasts and porterhouse and sirloin steaks show these characteristics.

Effect of Grade on Other Characteristics

In general, differences between tough and tender cuts are more accentuated in low-grade beef than in the good or medium beef. The proportion of bone is higher as a rule in lower grade than in good or medium beef. The proportion of fat is lower in low-grade beef than in the medium and good grades. The best cut from a low-grade animal may be inferior in texture, flavor, and juiciness to a less choice cut from high-grade beef. In other words, a prime rib roast taken from poor beef may prove to be less desirable than rump or chuck from a higher-grade carcass.

Methods of Cooking

The choice cuts of meat are the tender cuts. These should be cooked so as to develop and retain flavor. This is done by applying heat without any moisture in the pan. A very high temperature is used at first to sear the outside so that the juices will be retained. After the outside is seared or sealed up, the heat is lowered in order that the meat may cook through without burning. This method should be used for first-class roasts and steaks such as prime ribs, porterhouse and sirloin, and even chuck and rump from the high-grade animals.

In order to make tough, dry meat tender and palatable it is necessary to apply "moist heat," or to use water in cooking. Whenever water is added, however, some of the rich flavor of the meat is sacrificed. A part of it goes into the gravy but the volatile part passes off in the air as merely an appetizing smell. In order to keep in as much of the juices as possible the meat is seared over first at a high temperature just as in the case of the tender cuts. It is then cooked slowly with moisture in the pan so as to form steam. This steam helps to make the tough fiber tender, but at the same time it softens the outer crust and allows a part of the juices to leak out carrying much of the flavor from the meat into the gravy. This method is known to the housewife as pot-roasting or oven-braising and is used to soften the fiber of a moderately tough, dry cut such as a roast from the round and brisket. If very tough meat, for example neck or shank, is being cooked it should be surrounded with water. So much of the flavor of the meat will then be in the gravy that this becomes an essential part of the meat dish.

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UNITED STATES DEPARTMENT OF AGRICULTURE
LIVESTOCK EXHIBIT

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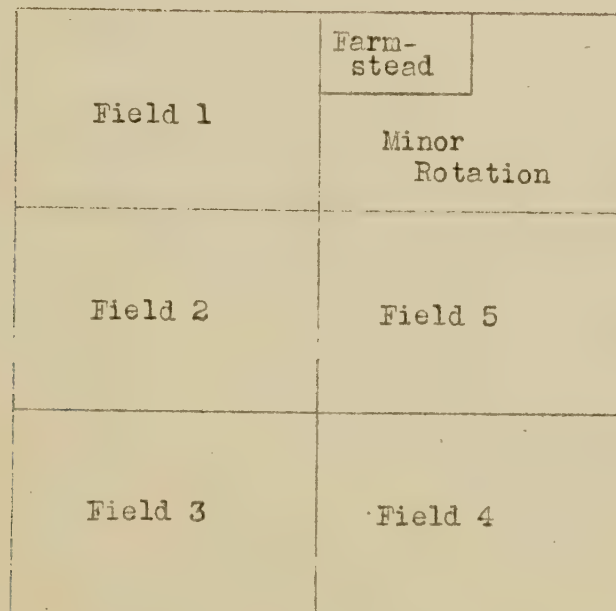
A POUND OF PORK EVERY SEVEN MINUTES

OR

THE STORY OF A WELL-ORGANIZED HOG FARM

This is not a phenomenal hog farm. Surely there are others as good, and there may be many which are better. This story tells how a farmer in Woodford County, Illinois, raises hogs successfully. If the soil is more fertile than the soil of other farms in that section it is because of the soil-improvement policy of its operator. The farm equipment is neither elaborate nor expensive and the owner has in mind many improvements which may come with the dawn of a more prosperous day. A large volume of business is done on this 160-acre farm, considering that the owner does all the work with the help of a hired man during the summer.

This farm is planned to follow a definite system of hog production with as little unnecessary work as possible. The following diagram shows that the farm is divided by straight-line fences into six fields.



One of these fields is sub-divided into the farmstead with its buildings and lots and several small fields which make up the "minor rotation". This "minor rotation" plays a large part in the success of the hog business on this farm. The five large fields in the farm make up the "major rotation" of the cropping system, providing for a five-year rotation of crops. The accompanying plan of this rotation shows what crops have been or will be in each field for a five-year period.

CROPS GROWN IN THE MAJOR ROTATION

Field No.	1922	1923	1924	1925	1926
1	Oats	Pasture	Corn	Early corn Soybeans	Corn
2	Corn	Corn Soybeans	Corn	Oats	Pasture
3	Pasture	Corn	Sweet Corn Soybeans	Corn	Oats
4	Corn	Oats	Pasture	Corn	Early corn Soybeans
5	Early corn Soybeans	Corn	Oats	Pasture	Corn

The rotation consists principally of three years of corn followed by oats and then clover. The three successive years of corn are modified slightly in the second year by growing soybeans and some other crop (usually an early variety of corn or sweet corn for the local canning factory). The second year is the proper place to insert the soybeans in the rotation as the fertility which they add to the soil will be beneficial to the corn the following year. The systematic use of clovers in the rotation, the plowing under of some growth for its value as green manure, and the grazing of live-stock in all the fields, contribute to the building up of soil fertility, and prevent the drain on the soil of three successive years of corn. Three years of successive corn is not a long time practice on this farm as this farmer has built up his fertility in the past and is now "cashing in" on this fertility by growing a little more than two years of corn continuously.

THE MINOR ROTATION.

A "minor rotation" is a series of crops in relatively small fields near the farmstead which are planned to aid in the production of livestock. Such a rotation is more generally used in the production of hogs than any other kind of livestock. Since forage crops have become quite popular in hog production, a minor rotation permits growing these pastures and other crops near the farmstead and provides several fields for the use of different bunches of hogs when the hogs are sorted. Under this system clean pasture is available each year. This is important as worms and disease are more readily controlled if clean pastures instead of the cramped feed lots are used. The owner of this farm attributes much of his success as a pork producer to the value of clean pasture for keeping his hogs in a thrifty condition.

A minor rotation on any farm may be adapted to different methods of raising hogs. If only a few hogs are raised, a three-year rotation of corn, oats, and clover might be sufficient. The clover pasture may be divided by temporary fences when the hogs are sorted. If a large number of hogs are produced more fields will simplify their management. Five fields are used in the minor rotation on this farm. Four of these fields are used for the minor rotation proper, consisting of corn, corn, oats and clover. The fifth field is divided to grow alfalfa and a small quantity of rye. Every fourth year a new field is seeded to alfalfa and rye and the old field of alfalfa and rye takes its place in the minor rotation. The crops which have been or will be planted in each field in this minor rotation for a five-year period are given in the following schedule.

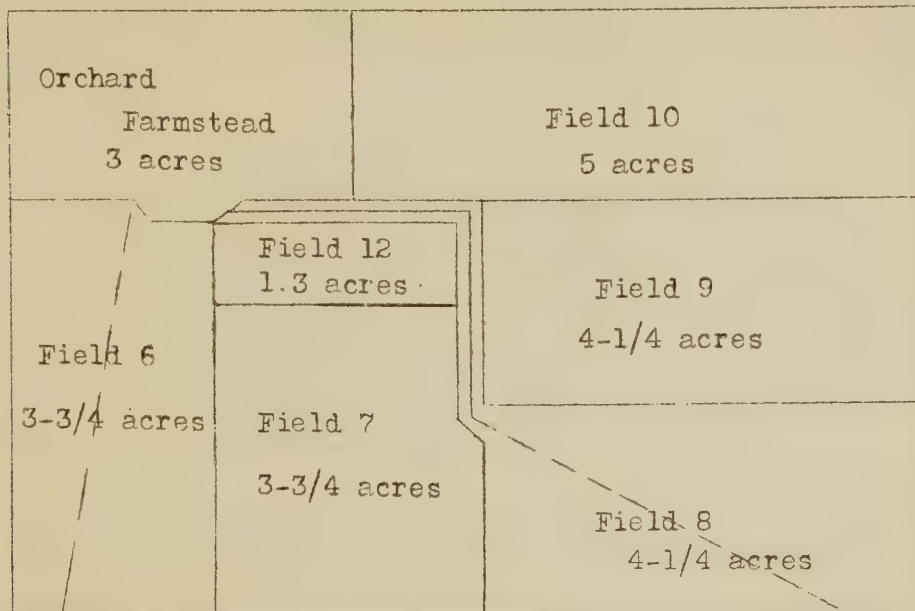
CROPS USED IN MINOR ROTATION.

Field No.	1922	1923	1924	1925	1926
6	Oats	Pasture	Corn	Oats	Pasture
7	Oats*	Alfalfa	Alfalfa	Alfalfa	Alfalfa
8	Corn	Oats	Pasture	Corn	Oats
9	Alfalfa	Corn	Oats	Pasture	Corn
10	Pasture	Corn	Corn	Corn	Oats*
11	Rye	Rye	Rye	Rye	Rye

*Oats seeded to alfalfa.

The use of so many different fields in the raising of hogs may increase the amount of labor required to care for them unless the minor rotation is carefully planned to make the chores as easy as possible. Access to water fountains from any of the fields should be provided by the use of temporary

or permanent lanes or by piping the water to each field. If self-feeders are used the hog chores are very light. The farmer in this story reduced his chores on hogs to a minimum by using self-feeders, hog waterers, and lanes from the pastures to the water. The following diagram of the minor rotation and lots shows the convenient arrangement of this farm.



Hogs may be shifted from one field to another through convenient gates. The temporary division fence in the clover pasture to accommodate two bunches of pigs and the double lane leading to the water and shelter is shown in the diagram for two years. The pigs were in Field 6 in 1923 and were in Field 8 in 1924.

THE PRODUCTION OF CROPS AND LIVESTOCK.

The crops grown on this farm are intended for the production of pork. Varying amounts of surplus crops may be sold from year to year as crop yields affect the balance between crops and livestock. The following table gives the acreage and yields of the crops grown on this farm for the crop year 1923.

CROPS GROWN ON FARM - Year 1923.

Crops	Major Rotation			Minor Rotation			Total
	Acres	Yield	Bushels	Acres	Yield	Bushels	Produced
Corn	69 $\frac{3}{4}$	55.8	3890	9 $\frac{1}{4}$	62.7	580	4470 Bushels
Oats	27	60.0	1620	4 $\frac{1}{4}$	62.3	265	1885 "
Soybeans	9 $\frac{1}{4}$	Fed in sheaf					200 tons
Alfalfa				3 $\frac{1}{4}$	3.0	10	10 "
Clo. Pasture	26			3 $\frac{1}{4}$			
Rye "				1			
Farmstead				7			

Soybeans were also planted with the corn. The yield of these beans was estimated at five bushels per acre. The total production of soybeans was probably in excess of 600 bushels. The hogs cleaned up the beans in the corn and the beans which were harvested were fed in the sheaf to the hogs and other livestock. Surplus supplies of oats and alfalfa hay were sold. The larger yields made in the minor rotation are probably due to higher fertility resulting from more intensive grazing by the hogs.

The amount of pork produced on this farm is shown by the following table giving in detail the production and disposal of each class of hogs.

SUMMARY OF PORK PRODUCED - YEAR 1923.

Class of hogs	Opening inv. No.	Opening inv. Weight	Purchases No.	Purchases Weight	Weaned No.	Sales No.	Sales Weight	Closing Inv. No.	Closing Inv. Weight	Died No.
Boars	2	600	1	200		1	470	2	700	
Old sows	11	3,300				12	3,385	20	6,000	
Gilts	21	4,200						15	3,000	
						82	23,630			4
Sp. pigs	86	17,000			235	64	11,530	151	30,265	5
Fall pigs	95	6,650			110	92	23,970	110	7,700	3
Total	215	31,750	1	200	345	251	62,985	298	47,665	12

Opening Inventory	215 Hogs	- 31,750 lbs.	Closing Inventory	298 Hogs	- 47,665 lbs.
Purchase	1 "	- 200 "	Sales	251 "	- 62,985 "
Weaned	345 "	- -	Dead	12 "	- -
Total	561 "	31,950 lbs.	Total	561 "	110,650 "

MARKETABLE PORK PRODUCED - 78,700 pounds

The increase in live weight during the year was 78,700 pounds when estimated weights are used in the opening and closing inventories. Twelve pigs of various weights died during the year. The weight of these dead pigs is not included in the total pounds of pork produced.

This farmer produced a pound of pork every seven minutes, day and night for 365 days. The details of how he handled the hogs to do this is told by following each bunch of hogs in their journey from field to feedlot to market.

HOW THE 86 SPRING HOGS WERE FATTENED.

These 86 spring hogs which were on the farm at the beginning of the year were housed in a small shed and had the run of a concrete paved lot where they were fed ear corn and whole oats. On March 7, eighty-two of these hogs averaging 288 pounds were sold for an average price of \$7.52 per 100 pounds. These hogs gained 1.34 pounds per day during this period.

HOW THE 95 FALL PIGS WERE FATTENED.

During the winter the 95 fall pigs occupied the small shed on the south side of the horse barn. They were fed a ration of ear corn with whole oats and a commercial mixed-protein feed in self-feeders. They cleaned up the soybeans in the cornfield and some soybeans in the sheaf were also fed them.

On April 1, these fall pigs were turned on five acres of clover pasture in Field 2. This field was pastured during the previous year and all but the five acres had been fall-plowed for corn. This pasture provided abundant grazing. The pigs were hand-fed ear corn and oats while on pasture. This pasture was plowed up for corn on May 1 and the pigs were transferred to Field 1 where they ran on a clover-mixture pasture with the horses and cattle. The pigs were fed during the summer on a ration of two-thirds corn and one-third oats. A mineral mixture of salt, ground raw rock phosphate, and agricultural limestone was before the pigs at all times.

On the twenty-eighth of May, 20 of the heaviest of the pigs averaging 260 pounds were sold for \$7.21 per 100 pounds. The remaining 72 pigs averaging 261 pounds were sold August 22, for \$8.20 per 100 pounds. The average daily gain of these pigs from January 1 to date of sale was 0.89 pound per pig. This daily gain undoubtedly would have been increased by a full feed of corn and a protein supplement. But it was this farmer's plan to sell these pigs in August, which he regarded as the most favorable month for marketing and he fed a ration which would have them ready for market at that time. A richer ration and a greater daily gain would have finished the pigs before the desired time.

THE CARE OF THE BREEDING HERD.

During the winter the breeding herd was housed in a portion of the small shed on the south side of the horse barn and had the run of small fields and a concrete lot for feeding. Ear corn and soybeans in the sheaf were fed during the first two months of the gestation period. This ration was changed to two-thirds corn, one-third oats, and tankage during the last half of the gestation period. Linseed meal was fed just previous to farrowing as a conditioner. The corn was fed in the evening and the oats in the morning to induce greater activity during the day.

Special attention was given the sows at farrowing time. They were given no feed for 24 hours after farrowing. Beginning with an ear of corn and some oats the second day, the ration was increased one ear of corn per day for five days and thereafter according to the condition of the sow and the size of the litter. Corn, oats, and a little tankage constituted the ration for the first three weeks following farrowing. The sows and litters were moved to the pasture as soon as the spring weather would permit. The sows were on almost a full feed of corn, oats, and some tankage until the pigs were weaned. By constructing creeps the pigs were fed shell corn, middlings, and tankage before weaning.

The spring pigs were farrowed during March and April in the central hog house, five individual A-type houses, and several pens arranged in the horse barn. The sows were cleaned by brushing, and plenty of bedding was kept in the farrowing pens. Thirty-two sows were bred for spring farrowing and there were no abortions or barren sows. These sows weaned 235 spring pigs or an average of 7.34 pigs per sow. The farrowing quarters were adjusted so that the sows could go into the lot for exercise and the pigs leave by a creep to exercise in the feedway of the hog house.

THE BROOD SOWS DURING THE SUMMER.

After the spring pigs were weaned the brood sows were placed in the small rye field and later in the alfalfa pasture. Twenty sows were bred for fall farrowing and the other twelve were fattened and sold on September 12. The brood sows were fed almost entirely on corn and alfalfa pasture. A very limited amount of oats and tankage was fed to them during the summer. The fall pigs were farrowed during August and were weaned about October 20. Twenty sows weaned 110 fall pigs or an average of 5.5 pigs per sow.

FATTENING THE SPRING PIG CROP.

The farmer in this story manages his spring pig crop so that the heavy end reaches the early fall market and the light end the late winter market.

The field of clover pasture in the minor rotation was divided by a temporary fence to accommodate the early and late pigs. The early pigs were grown as rapidly as possible on a self-fed ration of corn, tankage, and middlings. On September 12, the 64 early pigs were sold averaging 180 pounds each, for \$8.20 per 100 pounds.

The late pigs were hand-fed a ration of corn, oats, and tankage on clover pasture until August 1. They were then turned into the stubble clover in Field 4. The limited ration of corn, oats, and a little tankage was continued until November 10, when they were turned into the corn stalk field to clean up the soybeans and corn left from husking. Besides the 15 gilts which had been selected for the breeding herd, there were 151 of these late spring pigs on the farm on the date of the second inventory, January 1, 1924. They are ready to go into the feedlot to be fattened and sold some time in March, as has been described earlier in the story for the previous crop of pigs.

WEANING THE FALL PIGS.

The fall pigs were weaned on a self-fed ration of shell corn, oats, and a 50-50 mixture of tankage and Red Dog flour. During the fall months they grazed on alfalfa and rye pastures. There were 110 of these fall pigs on the farm on the date of the second inventory averaging about 70 pounds. They will be carried through the winter and fattened during the summer much the same as has been described for the previous crop of fall pigs.

FEEDS CONSUMED ON THE FARM

The amount of feed consumed by the livestock on this farm is shown in the following table which brings together the feeds produced, sold, purchased, and carried over in the inventories from year to year. The balance is the feed consumed by the livestock.

QUANTITIES OF FEED CONSUMED BY LIVESTOCK

	: : Corn	: : Oats	: : Hay	: : Soybeans	: : Purchased : commercial : feed
	: (Bushels)	: (Bushels)	: (Tons)	: : Sheaf	: (Dollars)
Opening Inventory	: 4,000	: 1,500	: 18	: :	:
Produced	: 4,470	: 1,885	: 10	: :	:
Purchased	: 570	: -	: -	: :	: 739.53
Total	: 9,040	: 3,385	: 28	: :	: 739.53
Closing Inventory	: 3,000	: 1,200	: 17	: Some	: 52.00
Sold	: -	: 785	: 2	: :	:
	:	:	:	:	:
Fed on Farm	: 6,040	: 1,400	: 9	: :	: 687.53
	:	:	:	:	:
Hogs	: 5,540	: 1,250	: -	: :	:
Other Stock	: 500	: 150	: 9	: :	:

The following table shows the quantities of feed which have been charged to the hogs on this farm and the amounts of each feed per 100 pounds of pork produced.

QUANTITIES OF FEED CONSUMED BY HOGS (78,700 pounds Pork)

Feeds	: : Total	: : Per 100 lbs.
Corn	: 5,540 bus.	: 7.04 bus.
Oats	: 1,250 bus.	: 1.58 "
Tankage	: 8,500 lbs.	: 10.80 lbs.
Middlings	: 4,200 lbs.	: 5.34 "
Commercial mixed feed	: 6,000 lbs.	: 7.62 "
Linseed meal	: 100 lbs.	:

These quantities of feed per 100 pounds of pork compare very favorably with other data secured by the United States Department of Agriculture on the amounts of feeds required to produce 100 pounds of pork.

SUMMARY OF PASTURES AND RATIONS

A clover mixture of alsike, red, and sweet clover and timothy is sown in all oat fields to provide plenty of pasture for the hogs and build up the soil fertility. That the abundant forage provided by sweet clover increases the carrying capacity of the pasture is the opinion of this farmer. The time which the various bunches of hogs were grazing on the different pastures during 1923 is as follows:

Breeding Herd.

April 1 to May 1 - Clover mixture, Field 1.
May 1 to June 15 - Rye, Field 11.
June 15 to Aug. 1 - Alfalfa, Field 7.
Aug. 1 to Nov. 5 - Stubble clover, Field 8.

Early Spring Pigs.

May 1 to Sept. 10 - Clover mixture, Field 6.

Late Spring Pigs.

May 1 to Aug. 1 - Clover mixture, Field 6.
Aug. 1 to Nov. 10 - Stubble clover, Field 4.
Nov. 10 to Jan. 1 - Soybeans in corn fields.

Fall Pigs (On Farm January 1, 1923)

March 15 to April 1 - Rye, Field 11.
April 1 to May 1 - Clover mixture, Field 2.
May 1 to Aug. 20 - Clover mixture, Field 1.

Farrowed During August 1923.

October 20 to Dec. 1 - Alfalfa, Field 7.
Dec. 1 - Rye, Field 11.

The variety of feeds in the ration used on this farm is seen from the following summary:

Breeding Herd.

Gestation period:-

First two months - corn and soybeans.
Last two months - corn 2/3, oats 1/3, tankage, linseed meal.

Suckling period:-

Corn, oats, tankage, almost full feed.

SPRING PIGS

Early spring litters - corn, tankage, middlings in self-feeders.

Late spring litters - corn, oats, tankage, and soybeans in corn fields.

FALL PIGS

Weaning Ration - corn, oats, tankage 1/2 and Red Dog Flour in self-feeders.

Winter Ration - corn, oats, mixed protein feed, soybeans in corn fields.

Summer Ration - corn, oats.

THE EARNING POWER OF THIS HOG FARM.

This farm was successful in producing a large amount of pork. If the farm expenses were reasonable and the price of pork fairly satisfactory, the farm should show a fair farm income. The summary of the business on this farm for the year 1923 is as follows:

Farm Receipts

Livestock.

Net increase.hogs.....	\$5,777.18
Poultry	122.52
Cattle	56.23

Crops.

Oats	368.76
Hay	33.90
Miscellaneous crop	45.00

Total receipts \$ 6,491.09

Farm Expenses

Decrease, feed and supplies	\$ 500.49
Purchased feed	547.00
Depreciation of farm improvements	253.00
" on farm machinery	204.00
" on work horses	10.00

Cash Farm Expenses:

Livestock expense	\$126.23
Misc. Crop expense	141.85
Hired labor	355.47
Taxes	425.96
Insurance	12.00
Miscellaneous	42.00
	<u>1104.00</u>

Total Farm Expense \$ 2,618.00

Net Farm Income \$ 3,873.09

When the cash farm expenses and the net decreases in the inventories of feed, buildings, and machinery are deducted from the farm receipts a farm income of \$3,874 remains. The farm income is the amount which the farm returned to the operator for his labor and the use of capital invested. If the operator's labor be valued at \$600 per year in addition to part of the family living secured from the farm, there remains \$3,274 as return on investment. The total investment on this farm for the year 1923 was \$62,317 of which \$50,000 was the owner's appraisal of the 160 acres of land and \$12,317 for investment in livestock, machinery, feed and supplies, and farm buildings exclusive of the dwelling. The return to capital of \$3,274 was at the rate of 5-1/4 per cent on an investment of \$62,317. The rate of return to capital depends largely on the value of the land which in this case was \$312.50 per acre. If the inventory value of the land were written down so that the total investment were \$55,000 the rate of return would be 5.95 per cent; if the total investment were \$50,000 the rate of return would be 6.55 per cent; and if the investment be reduced as low as \$45,000 or about \$200

per acre for the land the rate of return would be 7.27 per cent. When the net farm income of \$3,874 is placed on an acre basis, there is \$24.21 per acre as return for the operator's labor and capital investment.

From this analysis of the farm business, it is seen that the volume of pork which this farmer produced yielded a fair return. If hogs had been in a more favorable position on the market the return would have been more satisfactory.

RETURNS BY LIVESTOCK FOR FEED CONSUMED.

The returns which livestock make for the feed they consume is determined by the values of feed and livestock as well as efficient production. The average sale price of pork on this farm for 1923 was \$7.77 per 100 pounds. Feed was bought or sold on this farm for the following prices: Corn 70 cents, oats 47 cents per bushel, and hay \$17 per ton. If these prices are used for the feed consumed by the livestock, the livestock returned \$104 for each \$100 worth of feed they consumed. In other words, the livestock, principally hogs, returned slightly more than market price for their feed. The following table gives the amount which the livestock would have returned with varying values for feeds and pork.

<u>AMOUNT WHICH LIVESTOCK RETURNED FOR \$100 WORTH OF FEED WHEN</u>										
	:			:			:			
PORK IS	:	AND FEEDS ARE VALUED AT								
	:	Corn	.70	1/	Corn	1.00	Corn	.75	Corn	.50
VALUED AT	:	Oats	.47	:	Oats	.40	Oats	.35	Oats	.30
	:	Hay	17.00	:	Hay	20.00	Hay	15.00	Hay	10.00
	:			:			:			
\$ 7.77 per 100 lbs.*	:	\$104		:	\$ 80		:	\$ 102	:	\$ 141
	:			:			:		:	
\$ 6.00 per 100 lbs.	:	84		:	65		:	83	:	114
\$ 8.00 per 100 lbs.	:	106		:	82		:	104	:	144
\$10.00 per 100 lbs.	:	128		:	98		:	126	:	174
\$12.00 per 100 lbs.	:	150		:	115		:	147	:	204

*Actual values on this farm during 1923.

The story of how this farmer raises hogs is told. He was successful in handling the breeding herd and raised a large number of pigs per sow. These pigs were well cared for and made good gain on farm grown feeds and some protein supplements. The pigs were grown so as to be marketed at the right time. Since the relation of corn price to hog price was unfavorable to hogs the farm income and the interest earned on the capital invested does not show up as large as one would expect from the business done. But this is due to a market condition and not to the organization of the farm for economical pork production.

Three factors of success in hog production:

1. Convenient arrangement of quarters.
2. Good clean pastures.
3. Wholesome rations.

Livestock Exhibit

TON LITTERS

A ton litter is one weighing 2,000 pounds or more when 180 days old. It is a real test of a swine raiser's methods.

The ton-litter movement started in Indiana in 1921 and proved to be very popular. In 1924 contests were carried on in most of the main hog-producing States. During this year one litter was produced that weighed 4291 pounds when the pigs were six months old, which is supposed to be the best record up to date.

The object of the ton-litter movement is to teach hog men that success can be attained only when careful attention is given to all the details.

Profit in the hog business is determined by the difference between cost of production and market receipts. Cost of production is influenced largely by the size of litters and rapidity of gains in weight.

Cost of production is increased:

1. When the type of hogs used is faulty.
2. When litters are small or weak.
3. When sows are unable to nourish their litters properly, or to suckle them abundantly till weaned.
4. When pigs die from disease or through faulty management.
5. When feeds do not furnish all elements necessary for growth, development and finish.

Sows of good type, bred to suitable boars, when well fed and managed during the gestation period should produce large strong litters.

Sows and litters when abundantly fed with suitable feeds during a suckling period of ten or twelve weeks will supply vigorous pigs for the feed lot.

Worm treatment, the dipping vat, immunization against cholera, and sanitary practices will protect against disease losses.

Pasture, grain with supplementary protein feed, and mineral mixtures will develop and finish feeder pigs at early ages.

A very large per cent of those who have succeeded in producing ton litters have used purebred sires and dams of the same breed, some have succeeded with crossbred litters, but the success with grades has been very limited.

UNITED STATES DEPARTMENT OF AGRICULTURE

SUMMARY OF LIVESTOCK EXHIBIT

"THE MARKET WANTS CHOICE LAMBS"

In cooperation with the agricultural experiment stations of Indiana and Kentucky the Department is presenting some figures that show why choice lambs are worth more to the consumer and bring more profit to the producer than common lambs. Live lambs, models of lamb carcasses and photographs are used to illustrate the exhibit.

In one pen there is a choice market lamb sired by a purebred ram. The lamb has been docked and castrated, is free from parasites, and is well developed and finished. Sale records show that lambs grading choice brought 13.2 cents a pound on the Chicago market during the month of October, 1924. In another pen is a common market lamb of scrub breeding, apparently infested with stomach worms, lacking in size, thin in condition, undocked and not castrated. During October, 1924, lambs grading common averaged 10.1 cents a pound on the Chicago market. This gives the choice lamb an advantage of 3.1 cents a pound.

The central part of the exhibit shows full-size representatives of choice and common lamb carcasses in natural colors. The choice carcass represents a choice lamb that dressed 52 per cent. It shows that the meat of a choice carcass is thick and it has the characteristic appearance of lamb that is tender, juicy, of good flavor and attractive. Choice lamb carcasses on the Chicago market during October, 1924, averaged 21.8 cents a pound. The common carcass represents a common lamb that dressed only 43 per cent. It has the appearance of lamb that is tough, dry, of poor flavor and unattractive. Lamb carcasses grading common on the Chicago market during October, 1924, averaged 15.4 cents a pound. Choice lamb carcasses therefore averaged 6.4 cents a pound more than the common carcasses.

Photographs on the other sections of this exhibit suggest practices that are essential to the production of good lambs including the use of purebred rams of good quality, provision of abundant pastures for the flock, feeding the lambs grain when necessary, prevention and treatment of parasites, docking all lambs and castrating the market ram lambs. A picture is also shown of a flock of scrub lambs that averaged only 36 pounds on the market and brought only 3 cents a pound and beside this picture of scrubs is shown a photograph of choice lambs sired by purebred rams. These choice lambs averaged 82 pounds and brought 16-1/2 cents a pound on the market.

UNITED STATES DEPARTMENT OF AGRICULTURE

SUMMARY OF LIVESTOCK EXHIBIT

"SOME POINTS IN HORSE MANAGEMENT"

Among the fundamental factors in horse management the subjects of hitches, breaking and training colts, care of the feet, and the fitting and care of harness are of vital interest to horsemen and farmers.

In this exhibit a number of horse hitches which have been successfully used in various parts of the country are presented in model and diagrammatic form. Specifications for the size and location of singletrees and eveners are given as well as the methods of arranging lines for 3, 4, 5, 6, 7 and 8-horse combinations.

The value and usefulness of horses depends to a great extent upon the manner in which they are broken and trained. A lantern slide series entitled "Breaking and Training Colts" sets forth in graphic form accepted methods for handling unbroken and untrained horses. Suggestions are given for breaking to lead, to ride and for driving single and double. The data presented are supplementary to Farmers' Bulletin 1368, "Breaking and Training Colts."

That the axiom "no foot, no horse" may be better realized, the lantern slide series "Care of the Feet" is presented. Special emphasis is laid upon the method of preparing the foot for shoeing; a common kit of tools which should be owned by every horseman and farmer is shown. Several model hoofs illustrate various stages in the preparation of the hoof for shoeing and the proper method of trimming the feet of colts. Supplementary information regarding care of the feet is presented in Farmers' Bulletin 1419, "Care and Management of Farm Work Horses."

In order that the horse may be given maximum service, all parts of the harness should fit snugly, yet comfortably. Correct fitting of the collar combined with snug, properly adjusted hames aid materially in the prevention of sore shoulders by giving the right setting for the pull. Other portions of the harness should receive attention as follows: The bit should rest snugly on the bars of the mouth; the checkrein used but lightly; and the traces and lines arranged for an even pull under full control. The correct fit of a set of work harness is illustrated on a large horse figure.

The life of harness is largely dependent on the amount and kind of care given it. While most mending must be done at the time of breakage, all harness should be examined during dull seasons and necessary repairs made. It is, likewise, advisable at least once a year to take each set apart and give it a thorough cleaning and oiling. In order to make necessary repairs and keep harness in good condition a kit containing a hammer, pliers, tubular riveting machine and rivet sets, harness thread, needles and awls, beeswax, a shoe knife, harness soap and oil, metal polish and edge blacking should be available. A kit of such tools and accessories and a set of harness which has been kept in good condition through proper attention are shown in the exhibit.
